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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,657	10/26/2006	Shigeru Nishio	64851 (70904)	2426
21874 7590 08/25/2011 EDWARDS ANGELL PALMER & DODGE LLP P.O. BOX 55874 BOSTON, MA 02205				
EXAMINER				
LEGESSE, HENOK D				
ART UNIT		PAPER NUMBER		
2861				
MAIL DATE		DELIVERY MODE		
08/25/2011		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/567,657

Applicant(s)

NISHIO ET AL.

Examiner

HENOK LEGESSE

Art Unit

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-9, 11 and 13-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-945)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☒ Other: For Ref. JP 2002-172786

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/11/2011 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. (JP 2002-172786) in view of Nou (US 2003/0025744) and/or Mantell (US 6,264,298) and/or Yamada (US 2003/0085940).

Regarding claim 10, Kato et al teaches an electrostatic suction type fluid discharge device (figs.1,6) which discharges by electrostatic suction a fluid (ink), which is electrically charged by voltage application, from a fluid discharge hole of a nozzle (10,21) of a discharge head (figs.1,4) onto a substrate opposite to the nozzle (figs.1,6), wherein: the electrostatic suction type fluid discharge device (figs.1,6) comprises line-drawing means (means that applies voltage to the electrodes 11,7,6 of figs.1,6) for applying a voltage between the nozzle (10,21 which is one end of passage 9) and the substrate (15,16) while relatively moving the nozzle and the substrate so as to carry out line-drawing, the voltage being equal to or greater than a minimum voltage to induce discharge, that is a voltage required to start discharge of the fluid (figs.1,6 paragraphs 0011-0013), intermittent discharge which is performed at a frequency depending on the voltage and an electric conductivity of the fluid (paragraphs 0013-0020), and the fluid discharge hole (21) of the nozzle (10 having a diameter ranging from 0.01 μm to 15 μm (2 to 120 μm , paragraph 0005), and the discharge head discharging the fluid from the nozzle (10,21,9) not by a piezo element and/or a thermal element, but by electrostatic suction (figs.1,6, paragraphs 0011-0013).

Kato et al does not explicitly teach controlling a speed of the relative movement so that adjacent ones of discharge pattern are partly overlaid with each other.

However, Nou teaches fluid discharge device including controlling a speed of the relative movement so that adjacent ones of discharge pattern are partly overlaid with each other (the abstract, paragraphs 0017,0088),

Similarly, Mantell teaches fluid discharge device including controlling a speed of the relative movement so that adjacent ones of discharge pattern are partly overlaid with each other (col.8 lines 13-40, col. 11 lines 32-54),

Yamada also teaches fluid discharge device including controlling a speed of the relative movement so that adjacent ones of discharge pattern are partly overlaid with each other (paragraphs 0065-0067,0074),

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify ejection device of Kato et al such that to form overlapping droplets on the medium by controlling the relative speed based on the teachings of Nou and/or Mantell and/or Yamada in order to enable the printhead form high quality image and at high speed.

Regarding claim 12, Kato et al as modified by Nou and/or Mantell and/or Yamada above further teaches wherein, the line-drawing means controls the speed of the relative movement so that the adjacent ones of discharge pattern are overlaid with each other by 0.5 to 1.5 times of a vertical diameter of each pattern, the vertical diameter being a diameter orthogonal to a direction of the relative movement (the abstract and paragraphs 0017,0088 of Nou; col.8 lines 13-40, col. 11 lines 32-54 of

Mantell teaches overlapping of adjacent drops/patterns by one half or more of their diameter).

5. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hotomi (US 5,477,249) in view of Kato et al. (JP 2002-172786) and/or Hertz (US 4,196,437) and/or Grimes et al.(US 2002/0005876) and Nou (US 2003/0025744) and/or Mantell (US 6,264,298) and/or Yamada (US 2003/0085940).

Regarding claim 10, Hotomi teaches an electrostatic suction type fluid discharge device (figs.1,12) which discharges by electrostatic suction a fluid (ink 6, fig.1), which is electrically charged by voltage application, from a fluid discharge hole of a nozzle (15) of a discharge head (1) onto a substrate (16) opposite to the nozzle (15), wherein:

the electrostatic suction type fluid discharge device (fig.1) comprises line-drawing means (13) for applying a voltage between the nozzle (15) and the substrate (16) while relatively moving the nozzle (15) and the substrate (16) so as to carry out line-drawing (during printing the head 1 and the substrate 16 are relatively moved), the voltage being equal to or greater than a minimum voltage to induce discharge, that is a voltage required to start discharge of the fluid (voltage is applied by the control unit 13 to cause discharge of droplet 1d, fig.3), Hotomi further teaches intermittent discharge (1d) is performed at a frequency depending on the voltage and an electric conductivity of the fluid (col.4 lines 3-13,59-66 and figs.1-3,12),

Hotomi further teaches the fluid discharge hole, provided in the nozzle (nozzle hole 15), having a diameter about 20 μm (col.3 lines 60-61) and the discharge head (1) discharging the fluid from the nozzle (15) by the electrostatic suction attraction force applied by electrodes 17 and 9 (col. lines 30-37, fig.3). It should be noted that the piezo element (14, fig.1) is used only to form meniscus (fig.2) not to discharging the fluid from the nozzle (15).

Hotomi does not explicitly teach the nozzle (15) has a diameter ranging from 0.01 μm to 15 μm . Furthermore, Hotomi does not explicitly teach controlling a speed of the relative movement so that adjacent ones of discharge pattern are partly overlaid with each other.

However, Kato et al teaches fluid discharge device (figs.1,6) including nozzle having a diameter ranging from 2 to 120 μm (paragraph 0005),

Similarly, Hertz teaches fluid discharge device including nozzle having a diameter ranging from 2 to 100 μm (col.6 lines 38-40, col.4 lines 66-67), a nozzle having a diameter of 15 μm (col.6 lines 59-60),

Grimes et al also teaches fluid discharge device including nozzle having a diameter equal or smaller than 1 μm (paragraph 0038).

Nou teaches fluid discharge device including controlling a speed of the relative movement so that adjacent ones of discharge pattern are partly overlaid with each other (the abstract, paragraphs 0017,0088),

Similarly, Mantell teaches fluid discharge device including controlling a speed of the relative movement so that adjacent ones of discharge pattern are partly overlaid with each other (col.8 lines 13-40, col. 11 lines 32-54),

Yamada also teaches fluid discharge device including controlling a speed of the relative movement so that adjacent ones of discharge pattern are partly overlaid with each other (paragraphs 0065-0067,0074),

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made form the nozzle of Hotomi such that the diameter ranging from $0.01\mu\text{m}$ to $15\mu\text{m}$ based on the teachings of Kato et al and/or Hertz and/or Grimes et al and to modify ejection device of Hotomi such that to form overlapping droplets on the medium by controlling the relative speed based on the teachings of Nou and/or Mantell and/or Yamada in order to enable the printhead eject very fine droplets thereby improving the resolution of the printer and form high resolution high quality image more stably and at high speed.

Regarding claim 12, Hotomi as modified by Kato et al and/or Hertz and/or Grimes et al and Nou and/or Mantell and/or Yamada above further teaches wherein, the line-drawing means controls the speed of the relative movement so that the adjacent ones of discharge pattern are overlaid with each other by 0.5 to 1.5 times of a vertical diameter of each pattern, the vertical diameter being a diameter orthogonal to a direction of the relative movement (the abstract and paragraphs 0017,0088 of Nou;

col.8 lines 13-40, col. 11 lines 32-54 of Mantell teaches overlapping of adjacent drops/patterns by one half or more of their diameter).

Response to Arguments

6. Applicant's arguments with respect to claims 10 and 12 have been considered but are moot in view of the new ground(s) of rejection in view of the rejection of claims 10 and 12 with Kato et al in view of Nou and/or Mantell and/or Yamada under 35 U.S.C. 103(a). Regarding applicant's arguments that the references including Hotomi do not teach the new limitation in claim 10 have been fully considered but they are not persuasive. Applicant's attention is respectfully directed to the above rejection to claims 10 and 12 with Hotomi in view of Kato et al and/or Hertz and/or Grimes et al and Nou and/or Mantell and/or Yamada under 35 U.S.C. 103(a).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HENOK LEGESSE whose telephone number is (571)270-1615. The examiner can normally be reached on Mon.- Fri. Between. 8:00 AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MATTHEW LUU can be reached on (571)272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MATTHEW LUU/

Supervisory Patent Examiner, Art Unit 2861

H.L.
August 23, 2011